

REMARKS

Claims 1, 2, 5-14, 20-22, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii EP 0 743 727 A1 in view of Sun et al., "Piezoelectric Fields in Strained (In,Ga)As/GaAs Multiple-Quantum-Well Structures Grown on Vicinal (110) GaAs," (hereinafter "Sun") and Nishimura, U.S. Patent 5,081,519. Applicants respectfully traverse the rejection.

The Examiner cites Fujii as teaching "selecting a facet orientation of the III-Nitride quantum well layer and growing the III-Nitride quantum well layer with the selected facet orientation. [Citation omitted.] Fujii teaches selectively growing the III-Nitride quantum well layer with a[] hexagonal crystal structure (wurtzite or zinblende [sic]) of basal plane tilted from a (0001) plane by an angle in the range of 0 degree to a few degrees." See office action, page 3. The Examiner correctly states that Fujii is silent about selecting the facet orientation to control a field strength of a piezoelectric field therein.

The Examiner cites Sun "to show that the piezoelectric effect is necessary[il]y controlled during the selection of the facet orientation." The Examiner cites Nishimura to show "the selected facet orientation being tilted from a (0001) plane by an angle of at least 10 or less than 45 degrees. [Citation omitted.] Nishimura et al. discloses employing different plane directions." See office action, page 4.

Applicants respectfully traverse the rejection. Applicants respectfully submit that the Examiner is misinterpreting the teachings of Sun and Nishimura.

A. Sun and Nishimura are directed to GaAs-based devices

Unlike Fujii, which is directed to a "GaN system compound semiconductor double heterostructure in a light emission device," (see Abstract), both Sun and Nishimura are directed to GaAs-based devices. Regarding Sun, the Examiner has not pointed to any

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teaching or suggestion in Sun that the teachings of Sun are applicable to III-nitride devices as discussed in Fujii and recited in Claims 1, 6, 20, and 22. Applicants can find no teaching or suggestion in Sun supporting the Examiner's assertion that "piezoelectric effect is necessarily controlled during the selection of the facet orientation" for a III-nitride device. Similarly, regarding Nishimura, the Examiner has not pointed to any teaching or suggestion in Nishimura that the teachings of Nishimura are applicable to III-nitride devices as discussed in Fujii and recited in Claims 1, 6, 20, and 22. Applicants can find no such suggestion or teaching in Nishimura. Since both Sun and Nishimura are directed to GaAs-based devices and neither Sun nor Nishimura contains any suggestion that their teachings may be applied to III-nitride devices, Sun and Nishimura cannot be properly combined with Fujii. Claims 1, 6, 20, and 22 are thus allowable over Fujii, Sun, and Nishimura.

B. Sun is directed to zincblende crystals, while Fujii is directed to hexagonal crystals

Sun clearly states on line 26 of the second column of page 466 that the piezoelectric nature of the crystals discussed in Sun are due to the zincblende crystal structure:

"Semiconductors of the zinc-blende class are piezoelectric." In contrast to Sun, Fujii is directed to hexagonal crystals. Contrary to the Examiner's assertion on page 3 of the office action, zincblende is NOT a hexagonal crystal structure, as demonstrated in Applicants' Figure 3. Accordingly, even assuming, *arguendo*, that Sun shows "that the piezoelectric effect is necessarily controlled during the selection of the facet orientation" as asserted by the Examiner, this teaching is limited to a zincblende structure, as Sun contains no suggestion that its teachings apply equally to a hexagonal structure such as Fujii's.

Accordingly, a person of skill in the art would have no reason to combine Sun with Fujii to come to the conclusion that Fujii's use of tilted basal planes necessarily controls piezoelectric effect in a hexagonal crystal. Since Sun and Fujii cannot properly be

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combined, claims 1, 6, 20, and 22 are allowable over Fujii, Sun, and Nishimura for this additional reason.

C. The Examiner ignores the elements of Claim 20 and 22 directed to spontaneous electric field

Claim 20 recites "selecting a facet orientation of said III-Nitride light emitting layer to control a field strength of a spontaneous electric field therein." Claim 22 recites "selecting a facet orientation of said III-Nitride light emitting layer to reduce a magnitude of a combined field strength of a piezoelectric field and a spontaneous electric field therein." The Examiner has completely ignored the above-quoted elements of claims 20 and 22. The Examiner has not even attempted to demonstrate how the combination of references teaches the above-quoted elements of claims 20 and 22. In fact, Applicants cannot find the words "spontaneous electric field" anywhere in the office action. Applicants respectfully submit that the Examiner has failed to make a prima facie case of the obviousness of claims 20 and 22.

D. Conclusion

Since the Examiner has failed to demonstrate a motivation to combine the references, as argued in section B, and has failed to demonstrate a reasonable expectation of success, as argued in section A, the Examiner has failed to make a prima facie case of the obviousness of claims 1, 6, 20, and 22 in light of Fujii, Sun, and Nishimura. Claims 1, 6, 20, and 22 are thus allowable over Fujii, Sun, and Nishimura. All other claims depend from claims 1, 6, 20, and 22 are thus similarly allowable. In addition, with respect to claims 20 and 22, the Examiner has not demonstrated how the combination of references teaches every element of

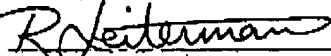
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the claims, as argued in section C. Claims 20, 22, and their dependent claims are thus allowable for this additional reason.

In view of the above arguments, Applicants respectfully request allowance of claims 1, 2, 5-14 and 20-27. Should the Examiner have any questions, the Examiner is invited to call the undersigned at (408) 382-0480.

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Respectfully submitted,



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